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| 09/817,821      | 03/26/2001  | Keith Hall           | SMX 3071.1 (99-22R1) | 7846             |

45735 7590 05/21/2007  
SENNIGER POWERS (SMX)  
ONE METROPOLITAN SQUARE  
16TH FLOOR  
ST. LOUIS, MO 63102

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| EXAMINER |
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GROSS, CHRISTOPHER M

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| ART UNIT | PAPER NUMBER |
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1639

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| NOTIFICATION DATE | DELIVERY MODE |
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05/21/2007

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

uspatents@senniger.com

|                              |                                  |                             |  |
|------------------------------|----------------------------------|-----------------------------|--|
| <b>Office Action Summary</b> | Application No.<br>09/817,821    | Applicant(s)<br>HALL ET AL. |  |
|                              | Examiner<br>Christopher M. Gross | Art Unit<br>1639            |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 02 March 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 90-122 is/are pending in the application.
- 4a) Of the above claim(s) 96,97,103-105,108-112,115,120 and 121 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 90-95,98-102,106,107,113,114,116-119 and 122 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

Responsive to communications entered 3/2/2007. Claims 90-122 are pending. Claims 96,97,103-105,108-112,115,120,121 are withdrawn. Claims 90-95,98-102, 106,107,113,114,116-119,122 are examined herein.

The Examiner on the present case has changed. See contact information below.

### ***Election/Restrictions***

Claims 96, 97, 103-105, 108-112, 115, 120, and 121 are drawn to non-elected species and/or inventions and thus these claims remain withdrawn from further consideration by the examiner, 37 CFR 1.142(b), there being no allowable generic claim. Accordingly, claims 90-95, 98-102, 106, 107, 113, 114, 116-119, and 122 are under consideration in this Office Action.

### ***Priority***

Applicant's claim for the benefit of a prior-filed application under 35 U.S.C. 119(e) is acknowledged. This application claims benefit of provisional application 60/191,933 filed 03/24/2000.

### ***Withdrawn Rejection***

The rejection of claims 90-95, 98-102, 106, 107, 113, 114, 116-119, and 122 under 35 U.S.C. 103(a) as being unpatentable over Weinberg et al. (US Patent 6,030,917) and Johnson et al. (*J. Am. Chem. Soc.*, **1995**, 117(23), pgs. 6414-6415) is hereby withdrawn in view of applicant's persuasive arguments.

### ***New Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 90-95, 98-102, 106, 107, 113, 114, 116-119, 122 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Johnson et al** (1996 JACS 117:6414-6415) in view of **Weinberg et al** (US Patent 6,030,917) as evidenced by **Zurek et al** (2004 Prog. Polym. Sci. 29:107-148).

The applied reference has a common inventor, i.e. Johannes A. M. van Beek and Vince Murphy, with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of

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invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). For applications filed on or after November 29, 1999, this rejection might also be overcome by showing that the subject matter of the reference and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person. See MPEP § 706.02(I)(1) and § 706.02(I)(2).

The claimed subject matter in claim 90 is drawn to:

A process for preparing and screening an array of metal-ligand compositions comprising:

[a] preparing an array of metal-ligand compositions in a plurality of discrete reaction vessels contained by or within an integrated structure, wherein the plurality of reaction vessels of the array contain different metal-ligand compositions and said preparing comprises delivering a metal-binding ligand and a dissolved, soluble metal precursor to each of the plurality of reaction vessels of the array which combine to form the metal-ligand composition, wherein said soluble metal precursor comprises a solublizing ligand and formation of one or more of the metal-ligand compositions is accompanied by the displacement of said solublizing ligand;

[b] delivering a polymerization monomer to the metal-ligand compositions in the plurality of reaction vessels of the integrated structure to prepare an array of polymerization mixtures therein, wherein one or more of said polymerization mixtures contains the displaced solublizing ligand resulting from the preparation of said metal-ligand compositions;

[c] subjecting the array of polymerization mixtures in the integrated structure to conditions conducive to the formation of a polymerization reaction product; and

[e] screening said array for a polymerization reaction product,

[d] wherein the displaced solublizing ligand reduces the catalytic activity of the metal-ligand composition in the polymerization mixture in the polymerization reaction by less than about 80%.

Claim 91 is drawn to the metal-ligand composition in the polymerization mixture in the polymerization reaction by less than about 50%.

Claim 92 is drawn to metal-binding ligands not bound to a solid support.

Claims 93-94 are drawn to various deposition protocols.

Claim 95 is drawn to a soluble metal of formula  $MR_n$ .

Claim 98 is drawn to various metals.

Claim 99 is drawn to various soluble metal precursors.

Claims 100-101 is drawn to the use of an activator and various deposition protocols.

Claim 102 is drawn to a metal binding ligand that has a coordination number that is greater than the absolute value of its respective charge.

Claim 106 is drawn to more than one solubilizing ligand

Claim 107 is drawn to various solubilizing ligands.

Claim 113 is drawn to activated polymerization mixtures.

Claim 114 is drawn to various activators.

Claim 116 is drawn to screening for homogeneous catalytic activity.

Claim 117 is drawn to olefin polymerization catalysis.

Claim 118 is drawn to screening for various physiochemical properties.

Claim 119 is drawn to screening for compatibility with various physiochemical methods.

**Weinberg et al** teach, throughout the document methods for the synthesis and characterization of arrays, i.e. libraries of homogeneous catalysts and organometallic compounds (see e.g. Abstract; col. 1, lines 16-25; col. 3, lines 30-36). Said homogeneous catalysis is taken as the homogeneous catalytic activity of claims 116.

Weinberg et al. disclose a method of making an array of metal-ligand compounds wherein a step comprises reacting a metal binding ligand with a metal ion (refers to the metal precursor) (see e.g. col. 3, lines 37-54; col. 9, line 45 to col. 10, line 15).

The array comprises different metal-ligand compounds at known locations and the synthesis can be conducted using solution-phase synthetic technique (refers to the limitation of a plurality of discrete reaction vessels contained by integrated structure and contain different metal-ligand compounds, and instant claim 92) (see e.g. col. 3, lines 55-64; col. 10, line 66 to col. 11, line 12; fig. 14). Said array according to Weinberg et al

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is taken as the plurality reaction vessels set forth in claim 90[a], [b] as well as the plurality of discrete reaction vessels set forth in claims 93 and 94.

The synthesis also includes adding an activator such as  $\text{PhNMe}_2\text{HB}(\text{C}_6\text{F}_5)_4$  (refers to instant claims 100, 101, 113, and 114) (see e.g. col. 11, lines 28-37). The metal ion is transition metal ions (refers to instant claim 98)(see e.g. col. 11, lines 13-17; col. 24, lines 46-48).

The metal-binding ligand includes ligands such as heterocyclic compounds and ancillary ligands (refers to instant claim 102) (see e.g. col. 15, line 61 to col. 16, line 11; col. 16, lines 20-34; col. 16, line 35 to col. 21, line 61).

Additionally, the libraries are screened for useful property such as polymerization reaction (see e.g. col. 11, lines 38-67; col. 26, line 63 to col. 27, line 10). Said polymerizations according to Weinberg et al is taken as the polymerization mixtures set forth in claim 90[e].

Weinberg et al teach in column 12, line 62 screening for mechanical properties, such as set forth in claim 118.

Weinberg et al teach in column 3, step (e) screening for suitability toward infrared imaging, such as set forth in claim 119.

*Weinberg et al do not teach preparation of a metal-ligand composition using the steps set forth in claim 90 concerning retained displaced solubilizing ligands.*

**Johnson et al** teach, throughout the document and especially scheme 1b, utilizing  $\text{Ni(II)R}_2\text{Br}_2$  based (metallocene) catalysts that convert ethylene and  $\alpha$ -olefins to high molecular mass polymers in the presence of methylaluminoxane (MAO).



**Zurek et al** provide evidence for the mechanism of scheme 1b according to Johnson et al. Zurek et al teach in example equation 1 (p 109), MAO displaces one solubilizing ligand from a metallocene complex to form a  $[L^1L^2MR]^+[MeMAO]^-$  ion pair. Furthermore, Zurek et al illustrate in equation 2 (p 109) and figure 39 (p 136), that  $[L^1L^2MR]^+$  represents an effective polymerization catalyst, even in the presence of a solubilizing ligand (i.e. in the form of  $[MeMAO]^-$ ).

Therein the MAO reaction in scheme 1b according to Johnson et al inherently, with evidence by Zurek et al, displaces a solubilizing ligand, such as set forth in claim 90[a]. And, in view of the supplementary material (see pp 9-10) of Johnson et al, indicating no intervening purification step was performed prior to subsequent hexene (alpha olefin) polymerization under MAO conditions, the polymerization mixture shown in scheme 1b of Johnson et al is taken as inherently, with evidence by Zurek et al, containing the displaced solubilizing ligand in the form of  $[BrMAO]^-$ , as set forth in claim 90[b].

Johnson et al teach in the paragraph bridging the left and right columns on page 6414 that MAO represents a type of *activator*. MAO being an activator, absent evidence to the contrary, provides polymerization enhancement in excess of 100 %, therein in the range of claims 90[e] and 91.

Said  $Ni(II)R_2Br_2$  catalysts according to Johnson et al are taken as  $MR_n$  when  $n=4$  as set forth in claim 95. The Bromine of  $Ni(II)R_2Br_2$  according to Johnson et al comprises two Bromine, such as set forth as the halogen in claims 99 and 107 and the solubilizing ligands being the same, as set forth in claim 106.

Said high molecular mass polymers catalysis of  $\alpha$ -olefins according to Johnson et al is taken as an olefin polymerization reaction, as set forth in claim 117.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to include a soluble metal precursor comprising a solublizing ligand plus MAO as taught by Johnson et al. in the method of Weinberg et al.

One of ordinary skill in the art would have been motivated to include a soluble metal precursor comprising a solublizing ligand plus MAO in the method of screening the metal-ligand composition for activity by way of polymerization reaction in the method of Weinberg et al. for the advantage of providing a catalyst system where simple variation of pressure, temperature, and ligand substituents allows access to the polymerization of ethylene and  $\alpha$ -olefins, as noted by Johnson: pg. 6415, right col., lines 16-22, therein providing for more facile laboratory manipulation of the various catalysts.

One of ordinary skill in the art would have had a reasonable expectation of success in combining the soluble (metallocene) catalysts comprising a solublizing ligand plus MAO as taught by Johnson et al with the libraries of homogeneous catalysts and organometallic compounds favored by Weinberg et al because Johnson et al has applied the catalyst toward olefin polymerization and Johnson et al provides a superior manner or working with said catalysts. Therefore it would not have been unreasonable to apply the soluble (metallocene) catalysts comprising a solublizing ligand as taught by Johnson et al as part of the method of Weinberg et al since both are concerned with alpha-olefin polymerization.

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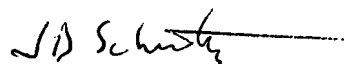
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher M. Gross whose telephone number is (571)272-4446. The examiner can normally be reached on M-F 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, J. Douglas Schultz can be reached on 571 272-0763. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Christopher M Gross  
Examiner  
Art Unit 1639

cg

  
J. DOUGLAS SCHULTZ, PH.D.  
SUPERVISORY PATENT EXAMINER